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Extending Health Care Coverage to the Low-Income Population: The Influence of the Wisconsin BadgerCare Program on Insurance Coverage

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Abstract

The Wisconsin BadgerCare program, which became operational in July 1997, expanded public health insurance eligibility to families with incomes below 185 percent of the U.S poverty line (200 percent for those already enrolled). This eligibility expansion was part of a federal initiative known as the State Children's Health Initiative Program **(**SCHIP). In this paper, we attempt to answer the following question: "To what extent does a public program with the characteristics of Wisconsin's BadgerCare program reduce the proportion of the low-income population without health care coverage?"

Using a coordinated set of administrative databases, we track three cohorts of mother-only families: those who were receiving cash assistance under the Wisconsin AFDC and TANF programs in September 1995, 1997, and 1999, and who subsequently left welfare. We follow these "welfare leaver" families on a quarterly basis from two years before they left welfare through the end of 2001, making it possible to use the labor market information and welfare history of the women in analyzing outcomes. Hence, these 19,201 families, together with their public and private health insurance coverage experience, are tracked for up to 25 quarters after leaving welfare.

We apply multiple methods to address the policy evaluation question, including pooled probit, random effects, and difference-in-difference strategies, and compare the results across methods. All of our estimates indicate that BadgerCare substantially increased public health care coverage for mother-only families leaving welfare. Our best estimate is that BadgerCare increased the public health care coverage of all leavers by about 17 percentage points and that BadgerCare increased the probability of these women having any health insurance coverage, public or private, by about 15 percentage points.

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I. INTRODUCTION

Soon after implementing the Wisconsin Works (W-2) welfare reform program in September 1997, Wisconsin also began developing its State Children's Health Insurance Program (SCHIP), "BadgerCare," which started operation in July 1999. Unlike SCHIP programs in most other states, the BadgerCare program provides income-conditioned health insurance to both adults and children in low-income families with minor children. It also substantially expands the Medicaid program (in Wisconsin known as Medical Assistance or MA) by providing Medicaid-equivalent health care coverage for both children and adults with incomes below 185 percent of the federal poverty line (200 percent for those already enrolled). As such, the program forms a model that has been studied by several other states and considered at the federal level.

Supporters of BadgerCare promoted it for two key reasons. First, the program offered a reduction in the uninsured population, which is heavily concentrated among the low-income population. Second, BadgerCare provided health insurance designed to assist low-income families, including welfare leavers, in finding and retaining employment in jobs that might not provide health insurance coverage.[1]

In this report, we analyze the extent to which BadgerCare (including its expansion of Medicaid coverage) was successful in meeting the first of these objectives. In particular, we attempt to answer the

[1]Tommy Thompson, the governor of Wisconsin at the time, said repeatedly that BadgerCare was intended as a complement to W-2—as a source of health care support for W-2 participants as they moved off cash assistance and into work. On the State of Wisconsin web site, the program is described as follows: "BadgerCare seeks to eliminate barriers to successful employment by providing a transition for families from welfare to private insurance. BadgerCare is based on the premise that health care is essential for working families with children." http://www.dhfs.state.wi.us/badgercare/html/glance-1.htm

following question: "To what extent does a public program with the characteristics of Wisconsin's BadgerCare program reduce the proportion of the low-income population without health care coverage?"[2]

II. WISCONSIN'S WELFARE REFORM—THE WISCONSIN WORKS (W-2) PROGRAM

In September 1997, Wisconsin eliminated its cash income support program, Aid to Families with Dependent Children (AFDC), replacing it with Wisconsin Works (W-2). Although W-2 removed the entitlement to cash income support that existed under AFDC, it ensures that all working-age adults who have incomes at or below 115 percent of the poverty line and who are parents of minor children have the opportunity to participate in work activities. Moreover, the state supports these activities with cash grants contingent on participation, child care assistance, and subsidized health insurance.[3]

Consistent with the federal welfare reform law enacted in 1996, program participants are subject to a 5-year lifetime limit on cash assistance, teen parents must attend school and live with parents who support them, and child support is aggressively sought from noncustodial parents.

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[2]We address the extent to which the program accomplished the second objective in a separate paper. This second question has not been studied since the inauguration of welfare reform systems that require and assist work. Some earlier research suggests that Medicaid coverage—in the context of an AFDC system with adverse work incentives—may reduce the labor force participation and employment of single women with children. However, this research may not be relevant in the policy regime that has developed in Wisconsin since the 1997 inauguration of its W-2 work-oriented welfare reform. For an example of the earlier research, see Moffitt and Wolfe (1992).

[3]W-2 work activities are arrayed in four tiers. In the highest tier, the most work-ready have standard jobs and are eligible for many services (including help in finding a better job, child care subsidies, and health insurance) as long as their earnings remain below eligibility thresholds. The next tier (which generally enrolls few people) provides subsidized jobs for those not quite job-ready. Participants in this tier are also eligible for noncash benefits. The third tier includes those not ready for private-sector jobs; they are placed in "community service" jobs funded by the W-2 agency. Participants are paid for their community service, but they are not eligible for the EITC, since the cash they receive is viewed as a grant and not as earnings. Those least able to work are in the fourth tier ("transitional jobs"). They are required to engage in productive activities (which may take a number of forms, including caring for a disabled child or participating in alcohol or drug abuse counseling), and also receive a grant. In a major departure from the AFDC program that preceded it, participants who are in the lower two tiers of W-2 (and therefore receive a grant for work done, rather than a wage payment) are provided the same level of support for full-time, full-year work regardless of family size. All program participants have a "Financial and Employment Planner" (or FEP) who advises them of their work options, assists them in choosing among these options, and helps them find child care, transportation, and other necessities.

According to Wiseman (1999), five features of W-2 distinguish it from reform policies in other states. First, the program focuses on adults, rather than children. Second, it denies cash assistance to most adults if they do not work full time. Third, eligibility for other services (health care, child care, transportation, child support enforcement) is not tied to receipt of cash benefits under Temporary Assistance for Needy Families (TANF), the successor to AFDC, and TANF funds are being used to augment some of these services. (Only about 17 percent of Wisconsin's state and federal TANF budget now goes to cash assistance grants—the remainder funds services such as child care, local case management and employment services, and transportation.[4]) Fourth, the program places strong emphasis on individual responsibility and reciprocity. Finally, nongovernmental organizations are sometimes responsible for running W-2 programs.

III. THE BADGERCARE PROGRAM

The U.S. government enacted the State Children's Health Insurance Program (SCHIP) in the Balanced Budget Act of 1997. The objective was to increase health insurance coverage among children living in low-income families who were not eligible for Medicaid. Beginning in 1998, $4.275 billion was appropriated in matching funds to states under this program. Although states are required to contribute their own funds in order to draw on the federal resources, the federal government pays a larger share of SCHIP costs than it does for Medicaid. In FY 1999, fewer than 2 million children were enrolled in SCHIP at any point during the year; the number increased to 3.3 million in 2000, to about 4.6 million in 2001, and to 5.3 million in 2002.

[4]Authors' calculation from data in Wisconsin Legislative Bureau, 2003, p. 717, Table 1.

States have substantial discretion in designing their SCHIP program. They can expand Medicaid, set up a separate program or combine the two programs; they can set eligibility thresholds,[5] decide whether to use presumptive eligibility, set requirements for the duration of time that a child must be uninsured before becoming eligible, and establish application procedures. Four states, including Wisconsin, obtained waivers that enabled them to extend benefits to parents.

Unlike cash assistance programs under AFDC and TANF, in which eligibility is conferred upon families, eligibility for MA and BadgerCare in Wisconsin is determined separately for each individual in a family unit. In addition, because the federal government reimburses a higher share of medical costs under SCHIP than under Medicaid, federal law requires states to serve children eligible for both programs under Medicaid rather than SCHIP.

The BadgerCare program substantially expanded eligibility levels for public health insurance coverage in Wisconsin. Children over age 5 and adults who are not pregnant and have minor children can enter BadgerCare with a family income up to 185 percent of the federal poverty line (FPL); the previous limit was 100 percent for children aged 6–14 and about 57 percent for children aged 15–18 and for eligible adults.[6] Those who have entered the program are able to remain on it until their incomes exceed

[5]Program designers had in mind children in families up to 200 percent of the federal poverty line (FPL), but states were free to extend benefits up to 50 percentage points beyond the state's 1997 Medicaid eligibility levels. In 2000, eligibility levels ranged from 133 to 300 percent of the FPL (U.S. GAO, 2001). Additional criteria for eligibility include not being eligible for Medicaid and being younger than age 19 (unless a waiver is granted to extend benefits to adults).

[6]The actual threshold for children aged 15–18 and adults was income eligibility for AFDC, which differed by family size. For the most common family size of three, the income threshold for AFDC eligibility was equivalent to about 57 percent of the FPL. Because children under age 6 and pregnant women received Medicaid coverage up to 185 percent of the FPL before BadgerCare, the new program did not extend initial eligibility thresholds for this population.

200 percent of the poverty line. Families with incomes above 150 percent of the poverty line paid a monthly premium equal to about 3 percent of their income during the period of this analysis.[7]
We hypothesize that a program which expands coverage so substantially, and to adults as well as children, should have significant effects on health insurance coverage. Figure 1 shows enrollment in BadgerCare from its inception through 2001, the period of analysis in this report. A striking feature of the program is the much higher enrollment of adults than children. In December 2001, adults composed about two-thirds of the total caseload of 90,000 participants.[8]

In the short time since its inception, BadgerCare has grown to become a major component of public health insurance coverage in Wisconsin. Figure 2 shows enrollment in all public "family-based" health insurance programs in the state (family-based programs require the presence of a minor child for eligibility and exclude people under the Supplemental Security Income program, SSI). In July of 1999, just before the introduction of BadgerCare, 218,000 people were enrolled in publicly subsidized family-based coverage. By the end of 2001 (the final date of our analysis) 367,000 people were enrolled in such coverage, including 90,000 BadgerCare enrollees.

IV. OUR RESEARCH APPROACH

In our research, we analyze the quarter-by-quarter effect of the BadgerCare program on the probability that low-income, single-mother families are covered by public health insurance, have any insurance, or are without coverage. We measure quarters in terms of the time since leaving cash assistance. We study three cohorts of mother-only families: those who were receiving cash assistance

[7] In July 2003 the premium was raised to 5 percent. If other family members do not elect BadgerCare coverage, pregnant women and children below age 6 receive Medicaid coverage up to 185 percent of the FPL without paying a premium.

[8] By August 2004 the BadgerCare caseload had grown to 100,949, two-thirds of whom were still adults.

FIGURE 1
Badgercare Enrollment April 1999-December 2001

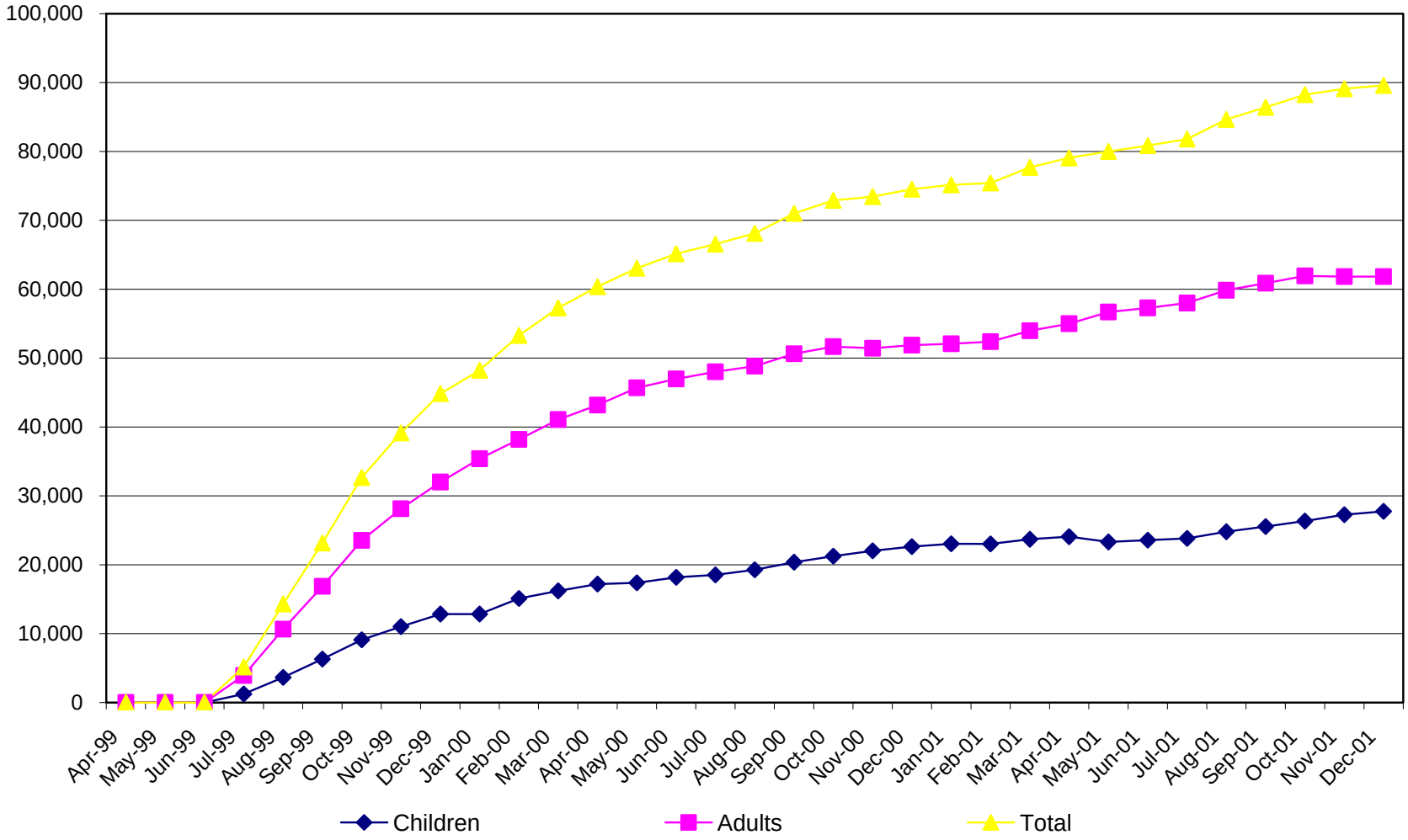
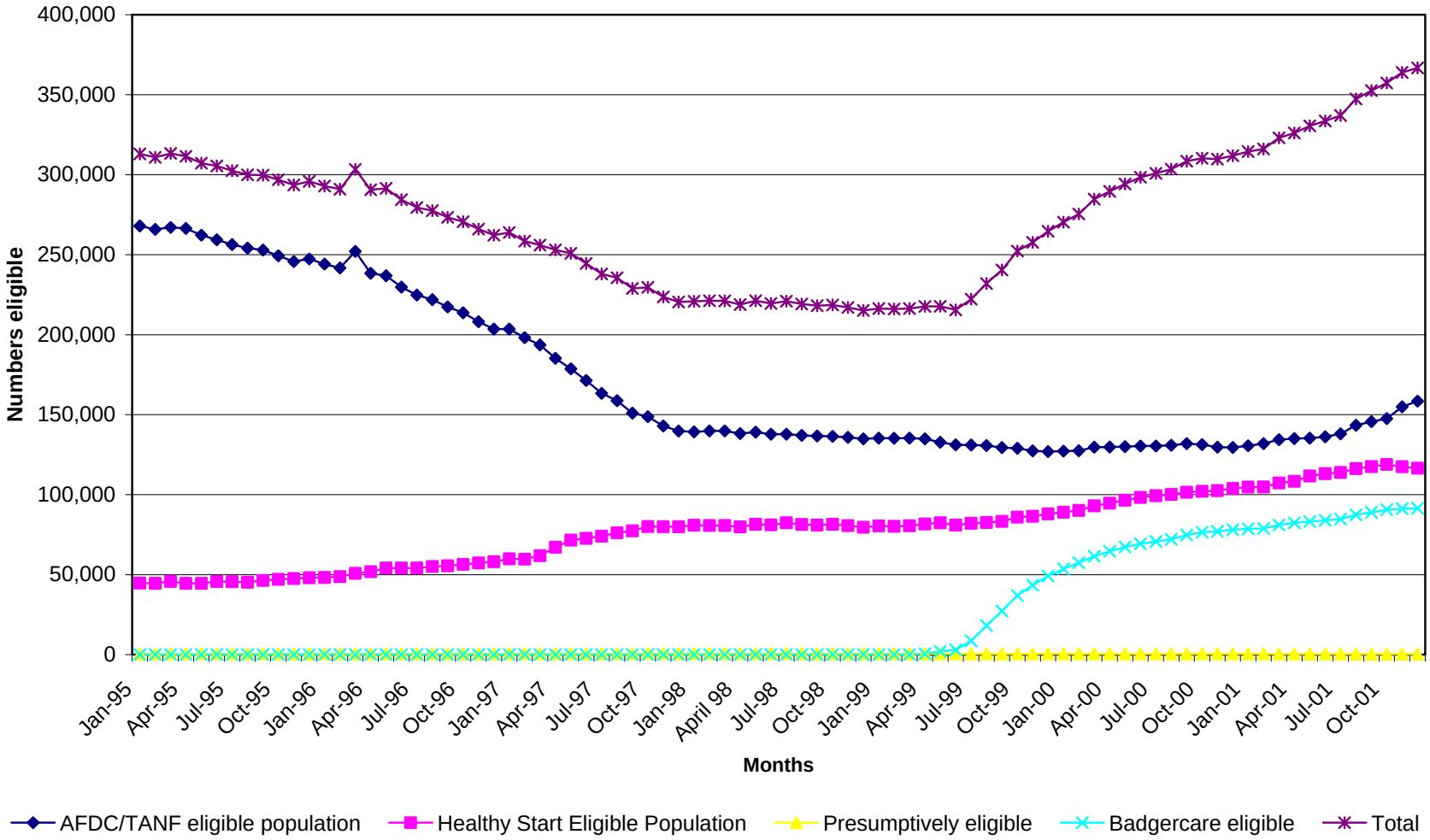


FIGURE 2
Enrollment in Public Health Insurance Coverage, Wisconsin, 1995-2001



under the Wisconsin AFDC and TANF programs in September 1995, 1997, and 1999, and who subsequently left welfare.

Using a coordinated set of administrative databases, we track these "leaver" families on a quarterly basis from two years before they left welfare through the end of 2001. Hence, we utilize the labor market information and welfare history of these women in analyzing the outcomes. Our analysis covers the period from the 4th quarter of the year they left welfare through the 4th quarter of 2001; 25 quarters for the 1995 cohort, 17 quarters for the 1997 cohort, and 9 quarters for the 1999 cohort. In estimating the effect of BadgerCare on insurance coverage, we measure the coverage patterns of these mothers from the period before BadgerCare to the period after BadgerCare was instituted. Although we also track the coverage of children of the members of each cohort, we focus on mothers because the extension of BadgerCare to families is a unique aspect of the program.

Identifying the causal effect of the implementation of BadgerCare on health insurance coverage is difficult, because other relevant changes in policy and in economic conditions occur over the same period that BadgerCare comes into existence. We adopt a variety of approaches in our effort to tease out reliable estimates of the effect of BadgerCare. First, we present regression-based estimates that control for both individual characteristics (such as prior work experience, welfare experience, duration since leaving cash assistance) and contemporaneous economic conditions (such as the county unemployment rate in the relevant quarter) that are also likely to affect health care coverage. Following this, we present random effects models seeking to capture the effects of unobserved characteristics on public health insurance coverage. Finally, we employ difference-in-difference estimates to isolate the impact of BadgerCare on coverage.

V. OUR DATA

The analysis reported here is based on administrative data from the state of Wisconsin. We merge Wisconsin data from: (1) the Client Assistance for Reemployment and Economic Support (CARES) system, which includes information collected in administering AFDC, W-2, and related means-tested

programs, (2) the Computer Reporting Network (CRN) system, the precursor of CARES, providing earlier AFDC administrative data useful for constructing an AFDC history for each case, and (3) the Unemployment Insurance (UI) system, which includes quarterly information on earnings and employers. (Appendix 1 provides details of the data sets and the variables used.)

These data include all women who were receiving assistance under the AFDC-Regular or W-2 programs in September of 1995, 1997, and 1999, and who were listed as the "case head" (without the father of any of the children also listed). We select from these participants those women who exited cash assistance within three months of our initial observation date and remained off the welfare caseload for at least two consecutive months. (Our samples include some women who returned to welfare within the next calendar year.)

Table 1 shows the characteristics of each cohort of AFDC recipients and leavers in the quarter of their exit. The observations included in our analysis consist of the 8,042, 8,162, and 2,997 women who left AFDC during the last quarters of 1995, 1997, and 1999, respectively. The rates of exit are 16, 40, and 41 percent for the three cohorts.[9]

Given earlier reforms and substantial declines in the caseload, we would expect women receiving benefits in 1997 and 1999 to have greater barriers to independence than those receiving benefits in 1995. The statistics in Table 1 are generally consistent with this expectation: the proportions of women with low education and work experience, large numbers of children, and a child with significant disabilities (children on SSI) are more highly represented in the later cohorts than in the 1995 cohort. The case heads

[9]Wisconsin began work-based welfare reforms in the late 1980s and implemented several major reforms in the mid-1990s before PRWORA. These include a Parental and Family Responsibility initiative and a Two-Tier AFDC Benefit Demonstration in 1994 (both initiatives covered four counties and both included Milwaukee County, by far the state's largest) and the Work Not Welfare program in two counties in 1995. The women in the 1995 cohort left cash assistance before Wisconsin implemented key *statewide* work-focused welfare reforms in September 1997; nevertheless, a climate of reform already existed. The 1997 cohort left cash assistance after the W-2 program had been transformed by waiver-based reforms and during its initial implementation. The final cohort, those who left cash assistance in 1999, left a W-2 program that retained its emphasis on work but had added substantial work supports in the form of child care and family health insurance.

Table 1
Characteristics of AFDC-Regular Caseload and Leavers in Wisconsin
(cases active in September 1995, September 1997, and September 1999)

	1995		1997		1999	
	Total[a]	Leavers[b]	Total[a]	Leavers[b]	Total[a]	Leavers[b]
Total (N)	49,605	8,042	20,608	8,162	7,363	2,997
Region						
Milwaukee	54.6	38.8	74.9	55.3	82.3	77.2
Other urban	29.6	36.7	17.7	30.8	13.0	17.1
Rural	15.8	24.5	7.4	13.9	4.7	5.7
Case Head's Age						
18–24	36.0	32.2	37.3	37.9	39.7	41.4
25–29	23.8	24.0	22.4	23.3	20.3	23.16
30–39	32.1	34.9	30.7	30.3	28.9	26.9
40+	8.1	9.0	9.6	8.5	11.1	8.5
Education						
<11 years	24.3	18.9	29.4	24.7	29.6	27.4
11 years	19.3	14.9	25.0	21.7	28.1	28.0
12 years	42.1	47.9	36.0	40.8	34.1	35.5
>12 years	14.3	18.4	9.6	12.8	82.2	9.1
Race						
White	40.4	53.6	22.2	34.8	17.5	19.6
African American	42.1	30.3	57.1	43.9	64.4	62.5
Hispanic	7.0	6.8	8.4	8.6	6.5	5.9
Other	4.4	3.8	4.2	5.2	1.4	1.7
Unknown	6.0	5.5	8.1	7.5	10.1	10.3
Number of Own and Foster Children						
1	39.0	46.8	33.1	35.3	37.0	35.8
2	29.7	30.2	29.0	29.8	29.3	29.4
3+	31.3	23.0	37.9	34.9	33.6	34.7
Age of Youngest Child						
<1 year	18.5	14.7	23.5	26.8	30.6	38
1 year	17.1	14.0	17.7	17.0	13.9	12.7
2 years	13.1	12.6	11.2	10.2	9.9	9.1
3–5 years	24.1	25.9	21.7	20.9	17.6	16.2
6–11 years	19.4	22.4	18.6	18.3	19.7	17.1
12–18 years	7.8	10.4	7.3	6.9	9.3	6.9
Other Household Members						
Other children only	2.6	1.8	4.0	3.0	6.1	6.6
Other adults only	21.0	23.3	18.6	19.7	17.7	16.8
Other adults and other children	7.5	8.2	7.5	7.7	6.3	6.8

(table continues)

Table 1, continued

	1995		1997		1999	
	Total[a]	Leavers[b]	Total[a]	Leavers[b]	Total[a]	Leavers[b]
Child on SSI	9.1	6.3	11.6	8.7	11.6	10.2
Start of Current Spell[c]						
0–3 months ago	14.8	27.7	17.0	20.7	34.0	36.4
4–6 months ago	6.8	10.3	9.8	11.6	19.1	22.1
7–9 months ago	5.2	6.6	6.8	7.7	9.9	10.7
10–12 months ago	4.4	5.4	5.3	6.0	6.3	6.1
13–18 months ago	7.1	7.0	6.4	6.7	6.3	6.4
19–24 months ago	6.1	5.1	4.6	4.7	3.6	3.2
> 24 months ago	55.7	37.9	50.2	42.5	20.8	15.2
Number of Months Received Welfare in the Two Years Prior to September 1995 and 1997[c]						
6 months or less	10.0	16.3	8.5	12.4	27.3	32.1
7–12 months	9.1	13.3	9.4	11.7	28.1	19.6
13–18 months	12.0	16.9	14.4	16.2	19.4	20.3
19–24 months	68.9	53.5	67.7	59.6	35.3	28.0
Number of Quarters with Earnings in the Two Years Prior to September 1995 and 1997[c]						
None	29.0	14.5	22.4	13.8	18.8	11.8
1–3 quarters	31.9	29.0	34.4	33.9	31.8	29.6
4–7 quarters	29.1	37.2	33.9	38.7	39.1	44.5
8 quarters	10.0	19.2	9.4	13.6	10.3	14.1
Total Earnings in the Two Years Prior to September 1995 and 1997[c]						
<$500	39.3	20.7	33.4	22.5	29.4	20.8
$500–$2,499	18.7	15.5	21.7	21.4	20.0	19.7
$2,500–$7,499	20.8	25.5	24.0	28.0	22.8	24.8
$7,500 or more	21.3	38.4	20.9	28.1	27.7	34.7

[a] Recipients in September.

[b] Left in the last quarter of the year.

[c] Sample in the first two columns includes case heads who were 18 or older in October 1995 (N=46,047 and 7,608); the third and fourth columns include those 18 or older in October 1997 (N=18,689 and 7,434); the fifth and sixth columns include those 18 or over in October 1999 (=7,363 and 2,997)

in the later cohorts are generally younger than in the 1995 cohort. Perhaps owing to their relative youth, the 1999 cohort contain a lower percentage of cases that had been on welfare during most of the previous two years.

With these demographic and income data, we identify all families from among the population of leavers in each of the three cohorts (1995, 1997, 1999) that are eligible for BadgerCare/MA benefits, using an income-based algorithm that calculates MA eligibility for each household member based on the poverty-related criteria for eligibility. Household earnings are calculated as the total earnings reported in the UI database, with deductions of $90/month for work expenses and $30/month plus 1/3 of the remaining earnings.

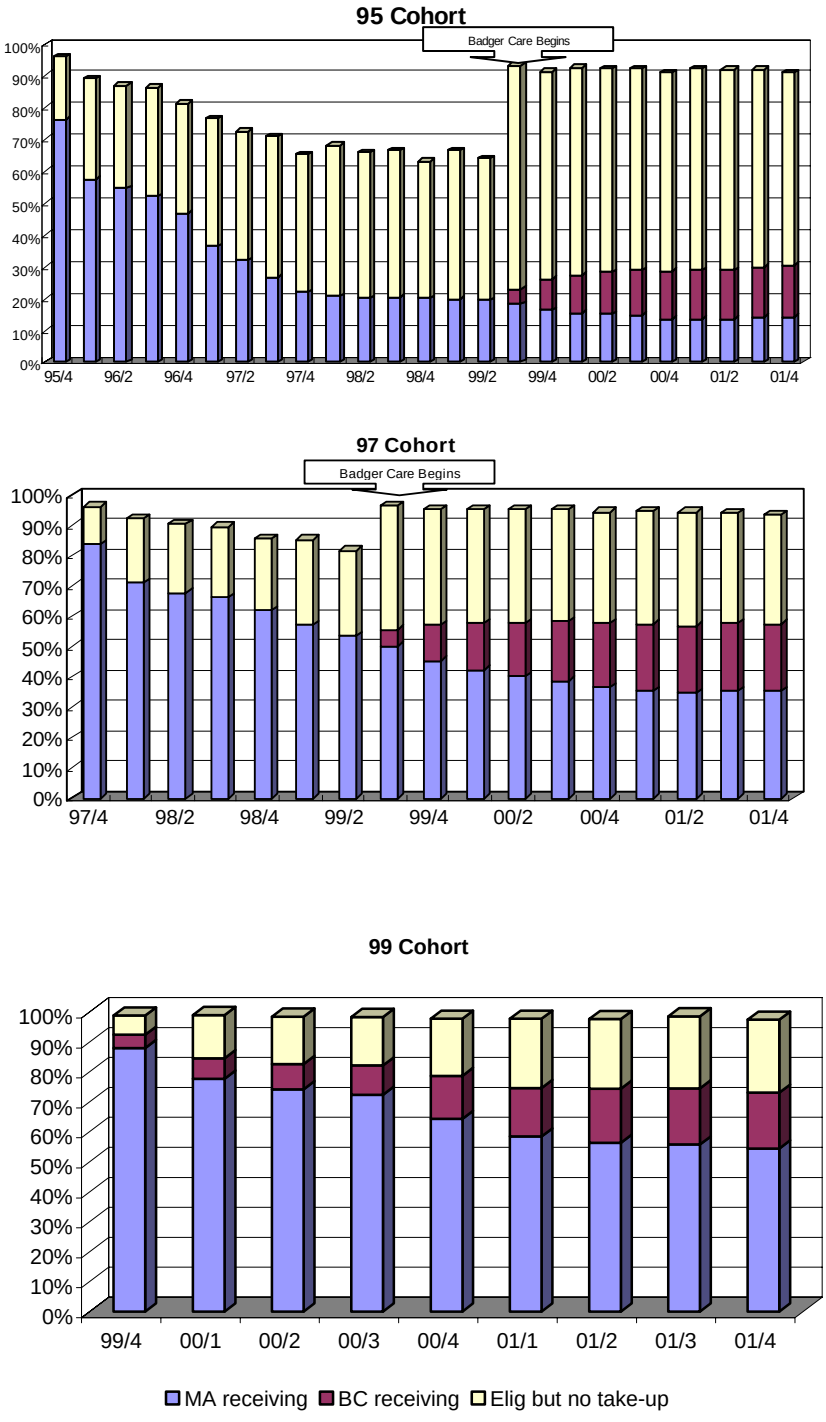
VI. SOME DESCRIPTIVE ANALYSIS

Public Health Insurance Coverage—MA and BadgerCare

Figure 3 shows the trends in the levels of eligibility for and take-up of public health insurance from the date of exit from cash assistance for each of the three cohorts of women. The height of the bars indicates the proportion of leavers who were eligible for public health insurance. Women eligible for coverage could either take up the insurance or not. We emphasize changes occurring at the time BadgerCare was introduced, in late 1999.

Panel A indicates that nearly all of the 1995 welfare leavers were eligible for MA at the time that they left cash assistance; about 80 percent of them accepted MA benefits. Both the percentage eligible and the percentage with MA coverage fell over the nearly four years from the time of exit until the beginning of BadgerCare. On the eve of BadgerCare implementation, only 63 percent were eligible for MA and fewer than 20 percent were enrolled; the proportion of those eligible who took up benefits had dropped to about 30 percent. A reasonable speculation is that the labor market success of some of the leavers reduced the proportion eligible for coverage.

FIGURE 3
Eligibility and Take-Up of Public Insurance



After BadgerCare was introduced in the third quarter of 1999, the proportions of women who were eligible and who took up available public insurance rose substantially. The proportion of the eligible again exceeded 90 percent because the BadgerCare program extends coverage more widely than did the MA program. The percentage of leavers accepting public health benefits also rose. By the end of 2001, nearly 30 percent of the leavers were enrolled in a public health insurance program, over one-half of them in BadgerCare. These patterns strongly suggest that BadgerCare contributes in an important way to increasing the public health care coverage of this group of women.

Panel B shows the same eligibility and take-up outcomes for the 1997 cohort. Relative to the 1995 cohort, a higher proportion of the 1997 cohort of leavers were eligible and covered by public insurance just prior to the introduction of BadgerCare; given their characteristics, this is not surprising. Again, however, the proportion of these women eligible for public health care coverage rose from about 80 percent to 95 percent just after the start of BadgerCare. Enrollment in a public health insurance program also increased to about 55 percent of the women by the end of 2001, up from about 52 percent prior to the start of BadgerCare. About 40 percent of those eligible were enrolled in BadgerCare.

For these two cohorts, then, the introduction of BadgerCare appears to have contributed to an increase in both the share of leavers eligible for public health insurance and the share of eligibles enrolled in either MA or BadgerCare. Both cohorts show some similar patterns: MA take-up among those eligible declined before the introduction of BadgerCare and continued to decline slightly in the first quarter after BadgerCare became available. Take-up of public health insurance programs among those eligible rose in the second quarter after BadgerCare began, suggesting that the publicity as BadgerCare was being initiated may have had a delayed effect in generating take-up. After this one-quarter delay, it appears that BadgerCare continued to arrest earlier patterns of take-up decline.

The patterns for the 1999 cohort are shown in Panel C. BadgerCare was an immediate option when this group left cash assistance. The proportion of women eligible for public health insurance remained above 90 percent for the entire period, and showed virtually no downward trend. This high rate suggests that most of the women in this late group of leavers had earnings insufficient to raise them above

BadgerCare eligibility levels. By the last quarter of 2001, more than 70 percent of these women were enrolled in a public health insurance program; over one-quarter of these were enrolled in BadgerCare.[10]

Health Insurance Coverage among Leavers

The health insurance coverage of leavers is not dependent solely on their eligibility for participation in BadgerCare and MA, for some leavers find jobs that provide employer-based insurance coverage or marry a spouse with family insurance coverage.[11] Our data can be used to provide an estimate of the extent of private insurance coverage among these cohorts of leavers, and hence the level of overall insurance coverage. We also provide an estimate of the extent to which these women remained uninsured—uncovered by both public and private insurance.

Wisconsin Unemployment Insurance files indicate whether a firm offers health insurance to its employees. Using the Unemployment Insurance records for each leaver, we estimate the number of leavers with their own employer-based insurance. We assume that leavers with all of the following characteristics have private health insurance: (1) they had worked for at least two consecutive quarters for the same firm, which offers health insurance to its employees, (2) they earn sufficient for us to deem them "full-time" workers,[12] and (3) they are not enrolled in MA or BadgerCare.[13]

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[10]Because the SCHIP program was designed to increase coverage of children, their eligibility and coverage is also relevant. Since eligibility was more generous for children than for their mothers under MA, we expect the patterns in eligibility and take-up to be more muted than those for mothers. For both the 1995 and 1997 cohorts, more than 80 percent of the children were eligible for public coverage through MA, so that the potential gain in eligibility from BadgerCare was far smaller than for their mothers. Eligibility remained high among both cohorts prior to BadgerCare, but enrollment eroded steadily over this period. On the eve of BadgerCare, the percentage of children enrolled in MA dropped to about 33 percent for the 1995 cohort (down from about 75 percent), and to 68 percent for the 1997 cohort (down from 84 percent). After BadgerCare was introduced, the share of children eligible for public health insurance increased substantially for both cohorts, and the erosion in the enrollment rate declined. For both cohorts, however, the percent of children enrolled in BadgerCare was small—around 6–8 percent. For the 1999 cohort of children, nearly 100 percent were eligible for MA coverage and the eligibility rate remained in the high 90-percent range over the period of observation. By 2001, fewer than 3 percent of the children of families in this cohort of leavers were covered by the new program. (Additional details are available from the authors.)

[11]We do not have data on whether leavers married or, if they did, who their spouse was.

[12]At least $2,343 in quarterly earnings—equal to 35 hours per week times the minimum wage of $5.15 per hour. We restricted our assumption of private coverage to those who worked for the same firm offering health

The pattern of health insurance utilization including private insurance coverage is shown in Figure 4. The utilization of private insurance steadily increased as the take-up of public health insurance dropped during the initial quarters after women left the cash transfer program, reflecting their greater participation in the labor market. From about six quarters after exit, the levels of private and public health insurance use remained fairly constant until BadgerCare began. On the eve of BadgerCare, almost 80 percent of 1995 leavers were eligible for some kind of health insurance: about 65 percent were eligible for public health insurance (from Figure 3) and 14 percent met our criteria for private health insurance. Similarly, around 87 percent of 1997 leavers on the eve of BadgerCare had some form of coverage, by our estimate: 81 percent from public health insurance and 6 percent from private coverage.

After the introduction of BadgerCare, the proportion of those eligible for some form of health insurance expanded; utilization of public health insurance increased and the uninsured population decreased. Figure 4 shows that public health insurance was more prevalent among the 1997 cohort than it was among the 1995 cohort; a larger percentage of the 1995 cohort had private coverage, probably reflecting their greater labor market success. Especially after BadgerCare went into effect, more of the 1995 than the 1997 cohort were eligible for public insurance coverage, but did not take up the program. A possible explanation is that, when BadgerCare began, leavers in the 1995 cohort had been away from

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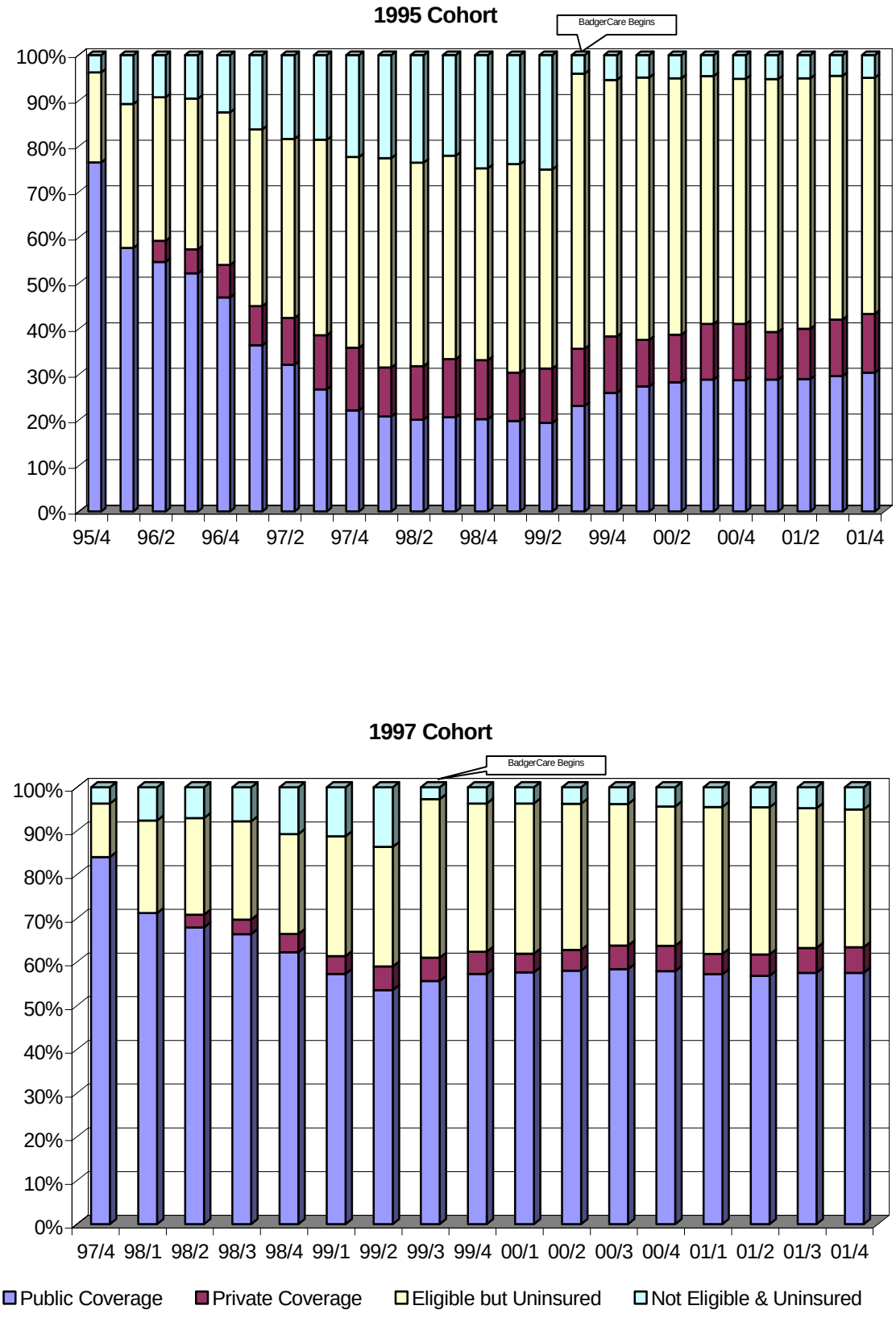
insurance for at least two quarters because employers commonly do not offer health insurance for new employees. The State of Wisconsin, for example, offers no health care plan to most employees until they have worked continuously for six months, and many private employers follow the same approach. Employers generally do not offer health insurance to employees working less than 50 percent of full time, and some employers offer health insurance only to full-time workers. Since many leavers are likely to earn more than the minimum hourly wage, the $2,343 earnings requirement seems appropriate.

[13]Wisconsin law does not allow potential BadgerCare participants who have access to private insurance at a moderate cost to participate in BadgerCare.

FIGURE 4
Decomposition by Coverage



contact with the welfare system for a longer time than their counterparts in the 1997 cohort. They were thus less likely to be aware that BadgerCare was available.

Figure 5 shows the percentage of leavers in the 1995 and 1997 cohort deemed to have no health insurance (public or private) in each quarter after they left cash assistance. In the first quarter after leaving, about 24 percent of the 1995 cohort and 16 percent of the 1997 cohort had no health insurance. That percentage rose in subsequent quarters: on the eve of BadgerCare (quarter 15 for the 1995 cohort and quarter 7 for the 1997 cohort), over 60 percent of the 1995 leavers and nearly 40 percent of the 1997 leavers lacked health insurance. The advent of BadgerCare reduced the percentage without health insurance, but not substantially. By the end of 2001 (quarter 25 for the 1995 leavers, and quarter 17 for the 1997 leavers), about 56 percent of the 1995 leavers and 37 percent of the 1997 leavers had no health insurance coverage. Even among those eligible for insurance, about 52 percent of the 1995 leavers and 32 percent of the 1997 leavers remained uninsured by the end of 2001.[14]

VII. MODELING THE EFFECT OF BADGERCARE ON PUBLIC HEALTH INSURANCE COVERAGE

Simple before-and-after comparisons suggest that BadgerCare increased the public health insurance coverage of leavers in the 1995 and 1997 cohorts. However, a variety of other factors may have been changing contemporaneously with the introduction of BadgerCare, and any reliable estimation of its effect must account for them. In this section, we first discuss an econometric framework for estimating the effect of BadgerCare on health insurance coverage, and then present a series of estimates designed to reveal this effect.

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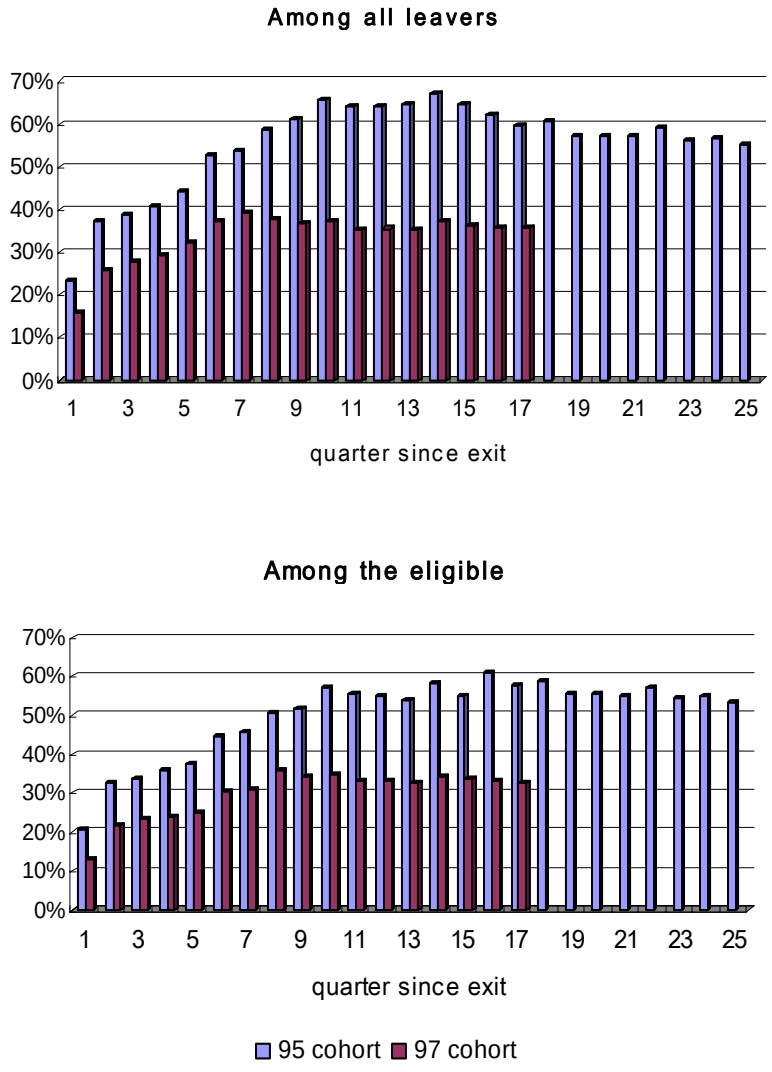
[14]As a test of sensitivity to our definition of private coverage, we used two alternative definitions: (1) working one quarter for a firm that offers coverage and earning at least $2,343 and a more stringent definition (2) that requires an individual to be in the third quarter of working for a firm that offers coverage and again earning at least $2,343. The patterns of any coverage reported in Figure 6 suggest very small differences except in the first quarter since exit (for both cohorts). The overall pattern is quite robust to these alternative definitions of private coverage.

FIGURE 5
The Proportion of Uninsured among All Leavers and Those Eligible for Public Coverage



Maximum Likelihood Estimation of the Effect of BadgerCare

Consider a latent variable y_{it}^* which determines participation in public health insurance. The decision equation is specified as:

$$y_{it}^* = \beta' x_{it} + \alpha_0 Q_t + \alpha_1 BC_t + \upsilon_{it},$$
$$y_{it} = \begin{cases} 1 \; if \;\; y_{it}^* > 0 \\ 0 \; if \;\; y_{it}^* \le 0 \end{cases}$$

where *i* indexes individuals, *t* indexes time period, and y_{it} is the binomial and observed dependent variable measuring public health insurance coverage. The explanatory variables influencing participation in public health insurance include demographic characteristics, x_{it}, number of quarters since exit, Q_t, and an indicator of the introduction of BadgerCare, BC_t. The error term υ_{it} is assumed to follow a normal distribution controlling for all observed independent variables:

$$\upsilon_{it} \mid x_{it}, Q_t, BC_t \sim N(0,1)$$

Hence, the probability of having public health insurance is shown as:

$$\Pr(y_{it} = 1 \mid x_{it}, Q_t, BC_t) = \Phi(\beta' x_{it} + \alpha_0 Q_t + \alpha_1 BC_t) \;,$$

and the log likelihood function is:

$$\log L = \sum_{i,t} [y_{it} \log\{\Phi(\beta' x_{it} + \alpha_0 Q_t + \alpha_1 BC_t)\} + (1 - y_{it}) \log\{1 - \Phi(\beta' x_{it} + \alpha_0 Q_t + \alpha_1 BC_t)\}]$$

The pooled probit estimation of the effect of BadgerCare, α_1, is consistent and asymptotically normal without any further assumptions. The variance of the estimate is obtained taking into account repeated observations of the same person over time.

Alternatively, the unobserved individual characteristics that persist over time may affect the decision to participate in public health insurance. In this case, the error term from the model above can be decomposed into the persistent and random components: $\upsilon_{it} = \theta_i + \eta_{it}$. In this case, the effect of BadgerCare, α_{it}, can be estimated controlling for unobserved effects. We assume that these unobserved

individual characteristics, θ_i, form a random variable that follows the conditional distribution $\theta_i \mid x_{it}, Q_t, BC_t \sim G(\cdot)$, where *G* is the cumulative density function of the exponential distribution. With this distributional assumption on η_{it}, the likelihood function can be constructed and a random effect logit model can be estimated.

The random effects model of the probability of having public health insurance that we estimate is:

$$\Pr(y_{it} = 1 \mid x_{it}, Q_t, BC_t, \theta_i) = \Lambda(\beta' x_{it} + \alpha_0 Q_t + \alpha_1 BC_t + \theta_i),$$

and the underlying likelihood function is:

$$\log L = \sum_i \log \int \prod_t \{\Lambda(\beta' x_{it} + \alpha_0 Q_t + \alpha_1 BC_t + \theta)\}^{y_{it}} \{1 - \Lambda(\beta' x_{it} + \alpha_0 Q_t + \alpha_1 BC_t + \theta)\}^{1-y_{it}} dG(\theta \mid x, Q, BC)$$

where Λ is the cumulative density function of standard logistic. The maximum likelihood estimate of the random effect logit regression provides a consistent estimate of the effect of BadgerCare on health insurance coverage with a large number of observations.

Difference-in-Difference Estimation of the Effect of BadgerCare

To deal with the effects of unobserved heterogeneity, we assumed the distribution of error terms. However, noticing the similar pattern of health insurance coverage of the 1995 and 1997 cohorts during the time since exit, we also adopted an alternative approach that treats the introduction of BadgerCare as a quasi-experiment to which the 1997 leavers, but not the 1995 leavers, were exposed. The difference in the proportion of leavers with (public) health insurance between the 1997 and the 1995 cohorts was taken to be the effect of BadgerCare. To the extent that the two cohorts of leavers differed, this approach may lead to biased estimates. Hence, in an alternative difference-in-difference estimate, we accounted for observed and unobserved differences in the two cohorts prior to the introduction of BadgerCare.

VIII. RESULTS

Maximum Likelihood Estimation

Pooled Probit Estimates of Effects

To better identify a tie between the implementation of BadgerCare and public health care coverage, we first estimated a probit equation in which having public health coverage was the dependent variable. We introduced into the estimation a large number of independent variables designed to reflect factors potentially related to public health care coverage, including race, education, age and number of children, number of other adults in the household, prior duration on cash assistance, earnings history while on welfare (for up to 8 quarters), the presence of any child in the family on SSI, the number of quarters since the woman exited cash assistance, and a dummy variable indicating whether the woman worked for a firm that offers its employees private coverage during the previous two quarters.[15]

In addition to individual characteristics, we also utilized the variation of locality by adding current area of residence, the current unemployment rate of each county, and the proportion of female-headed families in the woman's neighborhood. The general time effect on the outcome was captured by the number of quarters since exit. Finally, to capture the independent effect of BadgerCare on this outcome, we included a dummy variable for whether or not BadgerCare was available.

Table 2 presents our estimates of parameters and standard errors adjusted for repeated observation of each individual. The sign and magnitude of marginal effect of the control variables are, in general, as expected. The private coverage variable is lagged one quarter to avoid endogeneity; the

[15]We also estimated an alternative specification in which the estimated probability that the woman has private coverage is substituted for our dummy variable indicating public coverage. From merged employer-reported wages and information on whether each firm reporting earnings offers insurance to any of its employees (available from the Division of Unemployment Insurance in the Wisconsin Department of Workforce Development) and information on whether women have private health insurance coverage from the Wisconsin Family Health Survey, we created a variable indicating the probability that a woman had private health insurance. We use variables available in both our administrative data set and the Family Health survey in the estimation. The results of this specification and estimate are reported in Appendix I.

Table 2
Probit Estimation of Public Health Insurance Coverage

	1995 Cohort			1997 Cohort		
	Marginal Effects	Robust Std. Err.	z	Marginal Effects	Robust Std. Err.	z
Age of case head	0.00	0.00	1.16	0.02	0.00	6.41
Age of case head squared	0.00	0.00	-1.65	0.00	0.00	-7.17
Unrelated children in household	-0.03	0.01	-2.37	-0.04	0.01	-2.70
Child on SSI	-0.01	0.01	-0.52	-0.03	0.01	-1.79
Other adult in household	-0.01	0.01	-1.25	-0.01	0.01	-0.76
More than 1 spell on AFDC	0.00	0.01	0.36	-0.02	0.01	-2.44
Case head's education = 12 years	0.00	0.01	-0.52	-0.02	0.01	-2.55
Case head's education=> 12 years	-0.02	0.01	-2.39	-0.04	0.01	-3.53
Black	0.00	0.01	-0.27	-0.04	0.01	-3.91
Hispanic	-0.05	0.01	-3.47	-0.07	0.02	-4.48
Other race/ethnicity	-0.02	0.02	-1.03	-0.06	0.02	-2.51
Unknown race/ethnicity	0.02	0.02	1.46	0.00	0.02	-0.16
Had earnings in 1–3 of prior 8 quarters	0.08	0.01	6.57	0.05	0.01	4.00
Had earnings in 4–7 of prior 8 quarters	0.12	0.01	10.61	0.08	0.01	6.40
Had earnings in all 8 quarters	0.13	0.01	10.41	0.09	0.01	5.66
On AFDC 7–12 months	0.03	0.01	2.27	0.07	0.01	4.79
On AFDC 13–18 months	0.09	0.01	7.66	0.08	0.01	5.33
On AFDC 19–24 months	0.11	0.01	11.56	0.13	0.01	11.14
Rural	0.03	0.01	3.55	0.01	0.01	0.67
Milwaukee	-0.02	0.01	-1.76	0.00	0.01	-0.45
Female-headed households in county	0.08	0.03	2.72	0.13	0.03	4.25
Age of youngest child	-0.01	0.00	-7.45	-0.01	0.00	-6.30
Number of quarters since exit	-0.02	0.00	-54.91	-0.01	0.00	-15.47
Two children in household	0.10	0.01	12.30	0.10	0.01	8.95
Three or more children in household	0.18	0.01	21.52	0.16	0.01	14.49
Quarterly unemployment rate in county	0.01	0.00	7.34	0.01	0.00	4.89
Had private insurance in previous quarter	-0.30	0.00	-73.57	-0.53	0.01	-63.70
BadgerCare available	0.28	0.01	47.05	0.02	0.01	4.22
N	195,650			131,648		
Pseudo R square	0.13			0.09		

estimated coefficient on this variable is highly significant and negative as expected. The contemporaneous unemployment rate is positively and significantly related to having public health insurance coverage. The negative sign on quarters since exit is consistent with the picture of enrollment we noted above. The effect of the introduction of BadgerCare is positive and highly statistically significant. It shows that BadgerCare increased public health coverage by 28 percentage points for the 1995 cohort, but by only 2 percentage points for the 1997 cohort. After other factors likely to be associated with eligibility for, and take-up of, public coverage are controlled, BadgerCare appears to have substantially increased public health insurance coverage for this group of low-skilled single mothers.

Random Effects Estimates

To account for the effects of unobserved characteristics, we also estimated random effects logistic regression models. These estimates are run separately for mothers in the 1995 and 1997 cohorts, and the results are shown in Table 3. The coefficient on the BadgerCare variable for the 1995 cohort is positive (+2.06) and the standard error is .03. For the 1997 cohort, the coefficient on this variable is also positive but smaller (+0.23); it too is significant. These results also suggest that for both the 1995 and 1997 cohorts of welfare leavers the availability of BadgerCare was statistically significantly associated with an increase in the probability of having public health insurance coverage.

Estimated Effects of BadgerCare on Public Health Insurance Coverage

Because the coefficients in Tables 2 and 3 were estimated from a nonlinear model, it is difficult to perceive the quantitative importance of the availability of BadgerCare on the probability of public health insurance coverage. In Table 4, we present the results of a simulation of this probable effect, holding other variables in the estimates at their actual values. Simulated effects are presented for the pooled results without individual unobserved effects, and for the random effects estimates.

The first two columns of Table 4 suggest the effect of BadgerCare on public health insurance coverage from the pooled probit estimate of Table 2. Holding all other variables at their actual levels, the probability of having coverage with BadgerCare in place is .55 for the 1995 cohort, and .69 for the 1997

Table 3
Random Effects Estimates of Public Health Insurance Coverage

	1995 Cohort			1997 Cohort		
	Coefficient	Std. Err.	z	Coefficient	Std. Err.	z
Constant	-3.60	0.23	-15.49	-4.11	0.26	-15.52
Age of case head	0.12	0.01	9.64	0.23	0.02	14.47
Age of case head squared	0.00	0.00	-11.80	0.00	0.00	-15.95
Unrelated children in household	-0.40	0.07	-5.93	-0.23	0.07	-3.12
Child on SSI	-0.16	0.11	-1.45	-0.29	0.14	-2.11
Other adult in household	-0.01	0.05	-0.20	0.17	0.07	2.50
More than 1 spell on AFDC	0.09	0.04	2.19	-0.30	0.05	-5.60
Case head's education = 12 years	0.05	0.04	1.09	-0.15	0.06	-2.58
Case head's education=> 12 years	-0.11	0.06	-1.95	-0.49	0.08	-5.85
Black	0.07	0.07	1.04	-0.30	0.07	-4.24
Hispanic	-0.13	0.08	-1.64	-0.25	0.08	-3.05
Other race/ethnicity	-0.37	0.09	-3.93	-0.83	0.16	-5.24
Unknown race/ethnicity	-0.12	0.12	-1.07	0.10	0.11	0.90
Had earnings in 1–3 of prior 8 quarters	0.61	0.08	7.90	0.25	0.08	3.12
Had earnings in 4–7 of prior 8 quarters	1.06	0.07	14.86	0.62	0.08	8.23
Had earnings in all 8 quarters	1.00	0.08	12.42	0.32	0.09	3.53
On AFDC 7–12 months	0.21	0.07	2.89	0.45	0.11	4.03
On AFDC 13–18 months	0.62	0.07	8.89	0.56	0.10	5.40
On AFDC 19–24 months	0.93	0.06	15.71	0.89	0.09	9.64
Rural	0.23	0.05	4.21	0.15	0.08	1.81
Milwaukee	-0.08	0.06	-1.43	-0.03	0.06	-0.51
Female-headed households in county	0.28	0.22	1.31	1.19	0.20	5.88
Age of youngest child	-0.02	0.00	-8.96	-0.02	0.00	-4.19
Number of quarters since exit	-0.19	0.00	-97.30	-0.11	0.00	-28.81
Two children in household	0.65	0.04	17.64	0.63	0.06	11.36
Three or more children in household	0.81	0.04	19.73	1.07	0.06	18.49
Quarterly unemployment rate in county	0.17	0.01	24.97	0.17	0.01	16.50
Had private insurance in previous quarter	-2.82	0.04	-70.34	-2.80	0.05	-53.66
BadgerCare available	2.06	0.03	76.58	0.23	0.03	7.12
N	196,522			133,076		
Log Likelihood	-74758.27			-57583.20		

Table 4
Predicted Probability of Public Health Insurance Coverage

	Probit		Random Effects	
	1995 Cohort	1997 Cohort	1995 Cohort	1997 Cohort
At the actual values	0.392	0.681	0.367	0.647
BC is available; other variables at actual values	0.547	0.689	0.560	0.661
BC is not available; other variables at actual values	0.307	0.669	0.271	0.623
Education is < 12 years; other variables at actual values; BC available	0.553	0.701	0.560	0.682
Education is < 12 years; other variables at actual values; BC not available	0.312	0.681	0.271	0.645
Education is 12 years; other variables at actual values; BC available	0.549	0.684	0.567	0.658
Education is 12 years; other variables at actual values; BC not available	0.309	0.664	0.277	0.620
Education is >12 years; other values at the mean; BC available	0.533	0.666	0.544	0.600
Education is >12 years; other variables at actual values; BC not available	0.294	0.645	0.257	0.560

cohort. Without BadgerCare, these probabilities are .31 and .67, respectively. These estimates suggest that BadgerCare increased the probability of public health coverage by 24 percentage points for the 1995 cohort of leavers, but by only 2 percentage points for the 1997 cohort.

The final two columns of Table 4 present the simulated results from the random effects specification. The patterns shown there are similar to those for the pooled probit estimation. With BadgerCare in place, the probability of public health insurance coverage is .56 for the 1995 cohort and .66 for the 1997 cohort. Without BadgerCare, these two probabilities fall to .27 and .62, respectively. These estimates suggest that the introduction of the BadgerCare program raised the probability of having public health insurance coverage by 29 percentage points for the 1995 cohort and 4 percentage points for the 1997 cohort. [16]

Difference-in-Difference Estimation

Additional estimates of the effect of the BadgerCare program on the take-up of health insurance are possible using difference-in-difference comparisons between the 1995 and 1997 cohorts. A basic assumption underlies this approach—namely, that the experience and choices of the women in the two cohorts before the introduction of BadgerCare (when only MA was in effect) would have persisted had BadgerCare not been introduced.

Analysis of the Effect of BadgerCare on Public Health Insurance Coverage among Those Eligible

1) The Overall Effect of BadgerCare

As a first step, we measured the change in the take-up of public health insurance from before to after BadgerCare was implemented among those eligible. This change is the difference between the

[16]For both the pooled probit and random effects estimates, the with/without BadgerCare differences were generally similar for subsamples arrayed by education (less than 12 years, 12 years, and more than 12 years of education), suggesting that the effect of BadgerCare on the probability of having public health insurance was approximately equal across the education distribution.

projected coverage without BadgerCare and actual coverage over the period in which BadgerCare was in effect. Public health insurance coverage encompasses MA coverage and (during the period that it was in force) BadgerCare coverage.

We first calculated the take-up of public health insurance coverage by those in both cohorts who were eligible, from the first quarter after leaving the cash assistance rolls through quarter 15 after exit. (See Appendix 2, Figure A2.1.) Recall that the BadgerCare program did not begin for the 1995 cohort until the 16th quarter after they left cash assistance, but that for the 1997 cohort, BadgerCare was in place beginning the 8th quarter after exit.[17]

Before BadgerCare, when only the MA program existed for both cohorts, the cohort difference in take-up reflects differences in the overall propensity of the two groups to take up public health insurance, such as the varying tastes or socioeconomic characteristics of the groups or differences in the opportunities they faced. We assume that these basic differences persisted after BadgerCare was introduced.

Table 5 summarizes this overall effect of BadgerCare. Before BadgerCare, take-up among the women in the 1997 cohort who were eligible for public insurance averaged 74.1 percent, whereas take-up among the 1995 cohort averaged 59.4 percent. After BadgerCare, take-up among the 1997 cohort fell by 13.8 percentage points (to 60.3 percent), whereas that of the 1995 cohort fell by 27.6 percentage points. Hence, the change in take-up of public health insurance from before to after BadgerCare is 13.8 percentage points among those eligible, as shown in the last row of Table 5.

[17]For the 1995 cohort, these quarters since exit cover the period from 1995/4 to 1999/2; BadgerCare went into effect in 1999/3. For the 1997 cohort, these quarters since exit cover the period from 1997/4 to 2001/2.

Table 5
Take-Up of Public Health Insurance among Those Eligible

Take-Up among Eligibles	Pre-BadgerCare	Post-BadgerCare	Difference
1997 cohort	74.08 percent	60.32 percent	-13.76 pp
1995 cohort	59.54 percent	31.94 percent	-27.60 pp
1997–1995 difference	14.54 percent	28.38 percent	
Difference-in-Difference			13.84 pp

An alternative calculation yielding the same 13.8 percentage-point effect of BadgerCare is based on the 1997–1995 difference between the two cohorts in the take-up of public health insurance among eligible women.[18] Before BadgerCare, take-up of public health insurance (MA) among eligible women in the 1997 cohort exceeded that of the 1995 cohort by an average of 14.5 percentage points. However, after BadgerCare, the average difference in take-up of public health insurance between the cohorts averaged 28.4 percentage points. Assuming the propensity of the two groups to take up benefits persisted from before to after BadgerCare, 14.5 points of the 28.4 percentage-point gap in the period after BadgerCare are due to the different take-up propensities of the cohorts; the remaining 13.8 percentage points are attributable to the introduction of BadgerCare.[19]

2) Changes in BadgerCare and MA Coverage among Eligibles

As a next step in understanding the effect of introducing BadgerCare, we considered the separate patterns of MA and BadgerCare take-up. Since eligibility for BadgerCare is available only to those leavers with incomes above the eligibility limit for MA but less than 185 percent of the FPL, leavers with

[18]Appendix 2, Figure 1, shows this pattern for each of the 15 quarters, distinguishing the pre- and post-BadgerCare quarters.

[19]This can also be interpreted as follows (see the last column in Table 5). Take-up of public health insurance among the 1995 cohort decreased by 27.6 percentage points from before to after BadgerCare. If BadgerCare had not been introduced, the 1997 cohort would have shown a pattern of utilizing health care similar to that of the 1995 cohort. However, after the introduction of BadgerCare, the take-up of public health insurance by the 1997 cohort decreased by 13.8 percentage points. This suggests that BadgerCare retarded the erosion in public health insurance take-up for the 1997 cohort by 13.8 percentage points.

the lowest incomes would not be directly affected by the introduction of BadgerCare. If we assume that the propensity to take up MA among this low-income group of leavers was persistent over the 15 quarters, and that BadgerCare would have affected the take-up of public health insurance by other eligible leavers, the average percentage-point difference between the cohorts in overall public health insurance coverage can be attributed to the net direct contribution of BadgerCare and the indirect effect of BadgerCare on MA take-up.

The top row of Table 6 repeats the overall effect of BadgerCare on public health insurance coverage described in Table 5; this estimate of BadgerCare's effect does not consider any indirect effect of BadgerCare on MA take-up. (See Appendix 2, Figure A2.2.) The second row, for the period after BadgerCare, indicates that the average take-up of MA was 10.6 percentage points greater for the 1997 cohort than for the 1995 cohort. Thus the difference in MA take-up between the two groups after BadgerCare is 4 percentage points less than the difference between them before BadgerCare. This difference indicates that one effect of BadgerCare was to reduce MA participation among eligibles, perhaps because leavers could earn more and still have access to the BadgerCare (but no longer to MA) entitlement. As shown in the third row, BadgerCare both offset the decline in MA take-up and also increased overall coverage by 13.8 percentage points. Hence, the total contribution of BadgerCare to the overall increase in the take-up of public health insurance was 17.8 percentage points.

Table 6
Difference-in-Difference Effect of BadgerCare
on the Take-Up of Public Health Insurance and MA among Those Eligible

Take-Up among Eligibles	Pre-BadgerCare	Post-BadgerCare	Difference-in-Difference
(1) 1997–1995 difference in take-up of public health insurance	14.54 pp	28.38 pp	13.84 pp
(2) 1997–1995 difference in MA take-up	14.54 pp	10.59 pp	-3.95 pp
Difference (2)-(1)		17.79 pp	17.79 pp

Effect of BadgerCare on Public Health Insurance Coverage among All Leavers

1) The Overall Effect of BadgerCare

By focusing on differences between the 1995 and 1997 cohorts before and after BadgerCare, we were also able to estimate a difference-in-difference effect of BadgerCare on public health insurance coverage among all leavers. Again, the analysis assumes that the experience and choices of the two cohorts in the period before BadgerCare would have persisted had BadgerCare not been introduced.

As in the analysis for those eligible, we first calculated the average difference in public health insurance coverage between the 1995 and 1997 cohorts of all leavers during the quarters before BadgerCare began. Among all leavers in the 1997 cohort during the MA-only period, average coverage exceeded that of the 1995 cohort by 15.2 percentage points (see Table 7, row 3, and Appendix 2, Figure A2.3).[20] We again assumed that, in the absence of BadgerCare, this average percentage-point difference would have persisted; thus the effect of BadgerCare on public health insurance coverage among all leavers can be measured as the increase in the difference between the two cohorts (1997–1995) from before to after BadgerCare. When averaged over the entire 8 quarters after BadgerCare was introduced, public health insurance (MA and BadgerCare) coverage was 36.2 percentage points greater for the 1997 cohort than for the 1995 cohort, as shown in the third row of Table 7 for the period after BadgerCare.

Table 7
Take-Up of Public Health Insurance among All Leavers

Take-Up among All Leavers	Pre-BadgerCare	Post-BadgerCare	Difference
1997 cohort	66.10 percent	57.46 percent	-8.64 pp
1995 cohort	50.93 percent	21.25 percent	-29.68 pp
1997–1995 difference	15.17 percent	36.21 percent	
Difference-in-Difference			21.04 pp

[20]For example, in the first quarter after leaving, 84 percent of the women in the 1997 cohort were covered by public health insurance, compared to 76 percent of the women in the 1995 cohort, for a difference of 8 percentage points. By the time BadgerCare was introduced this difference had increased to 21 percentage points.

Comparing the average difference before and after BadgerCare suggests that BadgerCare increased the take-up of public health insurance among all leavers by 21 percentage points.[21] (See Appendix 2, Figure A2.3.)

2) Changes in BadgerCare and MA Coverage

For all leavers, the pre-post difference in overall public health insurance coverage of 21 percentage points reflects an increase in the 1997–1995 difference in MA coverage of 4.1 percentage points. This suggests a "spillover" effect: the introduction of BadgerCare increased MA coverage for the entire leavers group. The difference in MA take-up between the 1997 and 1995 cohorts of eligible leavers decreased from pre- to post-BadgerCare (see Table 6), whereas among all leavers it increased (see Table 8, Row 2). This suggests that BadgerCare might have encouraged use of MA among all leavers, perhaps because of the heavy advertising that accompanied the introduction of BadgerCare. Apart from this indirect effect on MA take-up, the effect of BadgerCare on the take-up of public health insurance among all leavers was 16.9 percentage points. (See Appendix 2, Figure A2.4.)

[21]Because the 1995 and 1997 cohorts have different socioeconomic characteristics, it is possible to control for these characteristics in obtaining a difference-in-difference estimate. We estimated a probit analysis specified to yield the difference-in-difference effect, while controlling for differences in the two cohorts in age, schooling, race, number and ages of children, past history of welfare receipt and work experience, the number of past welfare spells, other adults or children in the household, urban/rural location, the county unemployment rate, and the prevalence of female-headed families in the neighborhood. The resulting difference-in-difference estimate after accounting for these characteristics was 23.3 percentage points, about 2 percentage points (10 percent) larger than the estimate in the table based on actual data.

Table 8
Difference-in-Difference Effect of BadgerCare
on the Take-Up of Public Health Insurance and MA among All Leavers

Public Health Insurance Coverage among All Leavers	Pre-BadgerCare	Post-BadgerCare	Difference-in-Difference
(1) 1997–1995 difference in take-up	15.17 pp	36.21 pp	21.04 pp
(2) 1997–1995 difference in MA take-up	15.17 pp	19.30 pp	4.13 pp
Difference (2)-(1)		16.91 pp	16.91 pp

3) Effect of BadgerCare on Any Form of Health Insurance Coverage among All Leavers

Following a similar approach, we incorporated our definition of private health insurance coverage (described above) to obtain the difference-in-difference estimate of the effect of BadgerCare on being covered by any form of health insurance, public or private. Table 9 summarizes this effect. We concluded that BadgerCare led to an increase of 15.4 percentage points in the overall level of health insurance coverage (public plus private) among all leavers.[22]

Table 9
Difference-in-Difference Estimate of the Contribution of BadgerCare
to Overall Health Insurance Coverage among All Leavers

Having Any Form of Health Insurance	Pre-BadgerCare	Post-BadgerCare	Difference
1997 cohort	70.41 percent	63.61 percent	-6.79 percent
1995 cohort	58.40 percent	36.17 percent	-22.23 percent
1997–1995 difference in coverage	12.01 pp	27.44 pp	
Difference-in-Difference			15.43 pp

[22]We again estimated a probit analysis specified to yield the difference-in-difference effect, while controlling for differences in the two cohorts in the same characteristics as indicated in note 22. The resulting difference-in-difference estimate after accounting for these characteristics was virtually identical to the estimate reported above in table 8.

A difference-in-difference estimate of the effect of BadgerCare on private health insurance coverage alone suggests that the introduction of this policy decreased private coverage by 5.5 percentage points.[23] Although BadgerCare may have encouraged private employment by those covered, it may also have led to increased job holding in firms and sectors not offering private health insurance.[24]

Analysis among Groups Targeted by Eligibility Requirements

The terms of BadgerCare eligibility target the program on those leavers whose skills and employability are relatively high.[25] Hence, we conjecture that BadgerCare increased the insurance coverage of more employable women relative to less employable women—suggesting that the difference in health coverage between the 1997 and 1995 cohorts should grow more quickly for more employable leavers than for those less employable. To test this conjecture, we distinguished the group of leavers who had a high school diploma (and hence were more employable and more likely to be affected by BadgerCare) from those who had no diploma, and analyzed the difference-in-difference effect for each group separately. We then calculated the difference between the two group-specific effects, yielding a difference-in-difference-in-difference estimate.

Our conjecture was not sustained when the outcome of interest was any form of health insurance; we estimated that BadgerCare reduced health insurance coverage by about 2 percentage points more for women with a high school diploma than for those without the diploma. However, when the outcome of

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[23]

Private Insurance Coverage	Pre-BadgerCare	Post-BadgerCare	Difference
1997 cohort	**4.33 %**	**6.25 %**	**1.93 %**
1995 cohort	**7.48 %**	**14.94 %**	**7.46 %**
1997–1995 difference in coverage	**-3.15 pp**	**-8.69 pp**	
Difference-in-Difference			**-5.53 pp**

[24] This response is consistent with the theory of job lock. See Gruber and Madrian, 2001.

[25] As already noted, individuals are eligible for BadgerCare if they are not eligible for MA and have net income (gross income less a standard deduction) less than 185 percent of the FPL. If net income exceeds 185 percent of the FPL, and if the individual was a recipient of BadgerCare for the prior quarter, she remains eligible for BadgerCare as long as her net income is below 200 percent of the FPL.

interest was public health care coverage, the difference-in-difference-in-difference estimate supported the conjecture: BadgerCare increased the public health care coverage of leavers with a high school education by about 1 percentage point more than for those without that diploma. Both of these effects are very small, suggesting that BadgerCare had about the same effect on health insurance coverage for both high- and low-education women.

VIIII. CONCLUSION

The enactment of the BadgerCare program in Wisconsin provided a major expansion of health insurance availability, offering coverage to adults in low-income families with children, and increasing the income levels under which coverage is available. In this report, we examined the effects of BadgerCare on the health insurance coverage of low-income women who left cash assistance.

Table 10 summarizes the results of our analyses. All of our estimates indicate that BadgerCare substantially increased public health care coverage for mother-only families leaving welfare. This conclusion seems robust using different estimation approaches. Both approaches capable of showing the separate effects of BadgerCare on the 1995 and 1997 cohorts (the probit and random effects approaches) showed that BadgerCare had a much larger effect on health insurance coverage for the 1995 cohort than for the 1997 cohort. This is consistent with the greater labor market success and higher incomes of the 1995 cohort. As expected, the difference-in-difference approach, which estimated the effect of BadgerCare on both cohorts, showed effect sizes between the estimates shown for the 1995 and 1997 cohorts.

As the final column of Table 10 indicates, our best estimate is that BadgerCare increased the public health care coverage of all leavers by about 17 percentage points, and of eligible leavers by about 14 percentage points. The introduction of this program increased the probability of these women having any health insurance coverage, public or private, by about 15 percentage points.

Table 10
Comparison of Estimates of Role of BadgerCare on Health Insurance Coverage

Cohort	1995	1997	Overall
Marginal Increase in Probability of Having Public Coverage			
All leavers			
Pooled Probit			
(Variables at actual values)	0.240	0.020	
Random Effects			
(Values at mean)	0.289	0.038	
Difference-in-Difference			0.169
Eligible Leavers			
Difference-in-Difference			0.138
Marginal Increase in Probability of Having Any Coverage			
All leavers			
Difference-in-Difference			0.154

BadgerCare appears to have had a larger effect on the coverage of those women who were in the 1995 cohort of leavers; these women were among the most job-ready of the leavers, and hence were more likely to have lost their eligibility for MA. Although BadgerCare also increased the public coverage of the 1997 cohort, this group of women was more likely to have retained their eligibility for MA, and hence benefited less from the enactment of BadgerCare.

APPENDIX 1
Sample and Variable Definition

We extracted data from the CARES database for all women receiving assistance under the AFDC-Regular or W-2 programs in September of 1995, 1997, and 1999 who were listed as the "case head," who did not live with the father of any of the children also listed on the case, who had minor children in the case, and who were at least 18 years old and no older than 65. We selected from these participants those women who exited cash assistance within three months of our initial observation and remained off the welfare caseload for at least two consecutive months. Our samples included those who returned to welfare within the next calendar year as well as those who stayed off.

Demographic Variables

The demographic variables were taken from the CARES database and reflect family characteristics as of September 1995, 1997, and 1999. These variable include mother's age, mother's education level, mother's race, number of children in the household, age of the youngest child in the household, presence of other adults in the household, SSI status of household members, and the county of residence.

The analyses were done at the county level. Counties were grouped as follows: Milwaukee County; other urban counties (Brown, Calumet, Chippewa, Dane, Douglas, Eau Claire, Kenosha, La Crosse, Marathon, Outagamie, Ozaukee, Pierce, Racine, Rock, St. Croix, Sheboygan, Washington, Waukesha, and Winnebago); and rural counties (the other 52 counties in Wisconsin).

Employment and Earnings Variables

Employment and earnings information came from the Wisconsin Unemployment Insurance database. We have information on quarterly earnings from July 1993 through December 2001 for all the mothers in our sample. These data were used to calculate the presence of earnings and mean and median earnings for each quarter.

Geographic Variables

The percentage of female-headed households by ZIP code was taken from the 1990 census zip code-level database STF3B.

Monthly county-level unemployment rates are from the Wisconsin Department of Workforce Development, Local Area Unemployment Statistics. The reported unemployment rates are for the entire county, except for the following cases:

County	**Unemployment Rate Reported**
Brown	Green Bay MSA
Dane	Madison MSA
Kenosha	Kenosha PMSA
Marathon	Wausau MSA
Milwaukee	Milwaukee City
Racine	Racine PMSA
Rock	Beloit-Janesville MSA
Sheboygan	Sheboygan MSA

For sample members residing on an Indian reservation, unemployment rates for the following counties were used:

Indian Reservation	**County Unemployment Rate Used**
Red Cliff	Bayfield
Stockbridge Munsee	Shawano
Lac du Flambeau	Vilas
Bad River	Ashland
Oneida	Green Bay MSA

Private Health Insurance Variables

These variables come from the Wisconsin Family Health Survey for 1998 and 1999. The survey, conducted by telephone on a continuous basis, includes questions abut the health insurance coverage and demographic features of households in Wisconsin. The respondent in each household is the adult with most knowledge of the health status and insurance coverage of all members of the family. The survey results are intended to be representative of Wisconsin household residents. The pooled 1998 and 1999 surveys yielded a sample of 4,894 households and 12,928 residents.

The survey asks whether each sample member is currently covered (at the time of the survey) by no insurance, private insurance only, Medicaid only, Medicare only, or by four possible combinations. The probit analysis of private insurance coverage utilizes members of the sample who were identified as private insurance only.

Appendix 2
The Effect of BadgerCare on Public Health Insurance Coverage among Those Eligible

The Overall Effect among Eligibles

The public health insurance take-up pattern for those eligible in the two cohorts is seen in Figure A2.1, which shows the take-up of public health insurance among those eligible, by quarter, for both cohorts. Before BadgerCare was introduced, the time pattern between the two cohorts is similar, though take-up for the 1997 cohort was greater than for the 1995 cohort. However, after BadgerCare was introduced, the take-up of public health insurance among the 1997 cohort remained relatively constant, whereas that of the 1995 cohort continued to erode.

The quarter-by-quarter pattern of the difference in take-up between the 1997 and 1995 cohorts is shown in the lower panel of Figure A2.1. After quarter 8, when BadgerCare was introduced, the difference in take-up among women who were eligible for public health insurance was significantly greater than in the period before BadgerCare. The average before and after difference in take-up reflects the difference-in-difference estimate.

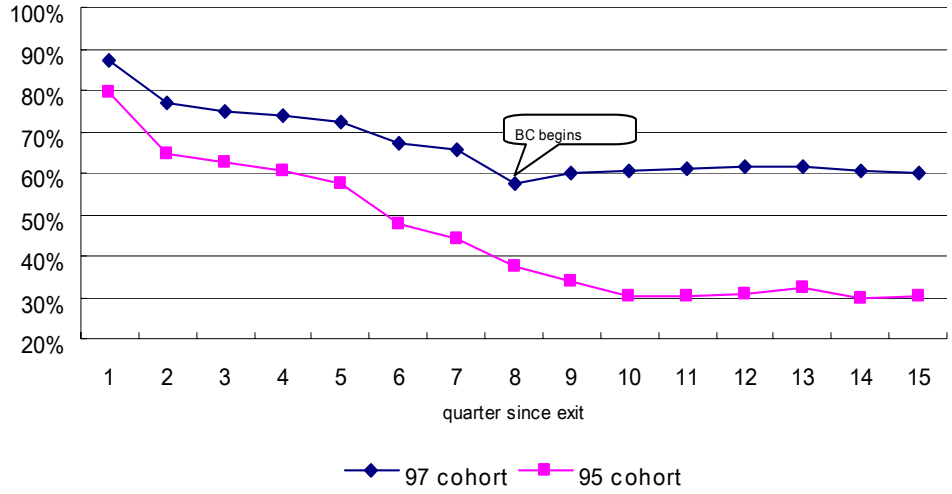
Changes in BadgerCare and MA Coverage among Eligibles

The combined effect of BadgerCare on both overall and MA coverage can also be studied by the difference-in-difference technique. The quarterly pattern of the 1997–1995 difference in both overall and MA coverage is plotted in Figure A2.2. The 1997–1995 difference in the coverage of MA shows a modest decrease after the introduction of BadgerCare, which suggests that BadgerCare both offset decreases in MA coverage among some of the eligible population and increased overall public health care coverage. The 1997–1995 difference in overall coverage rose substantially after BadgerCare, reflecting the total contribution of BadgerCare.

The lower panel of Figure A2.2 shows the overall quarter-by-quarter difference-in-difference effect of BadgerCare after its introduction. This difference-in-difference effect increased from about 5

percentage points in the 8th quarter to about 23 percentage points in the last few quarters; it averaged about 17.8 percentage points over this period.

Figure A2.1
Among Eligible Participants: The Take-up Rate of Public Health Insurance and the Difference between the 1997 and 1995 Cohorts



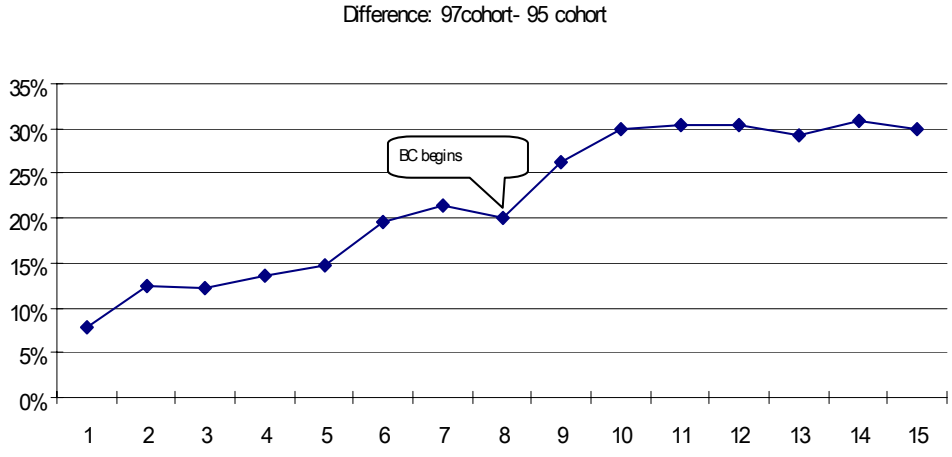
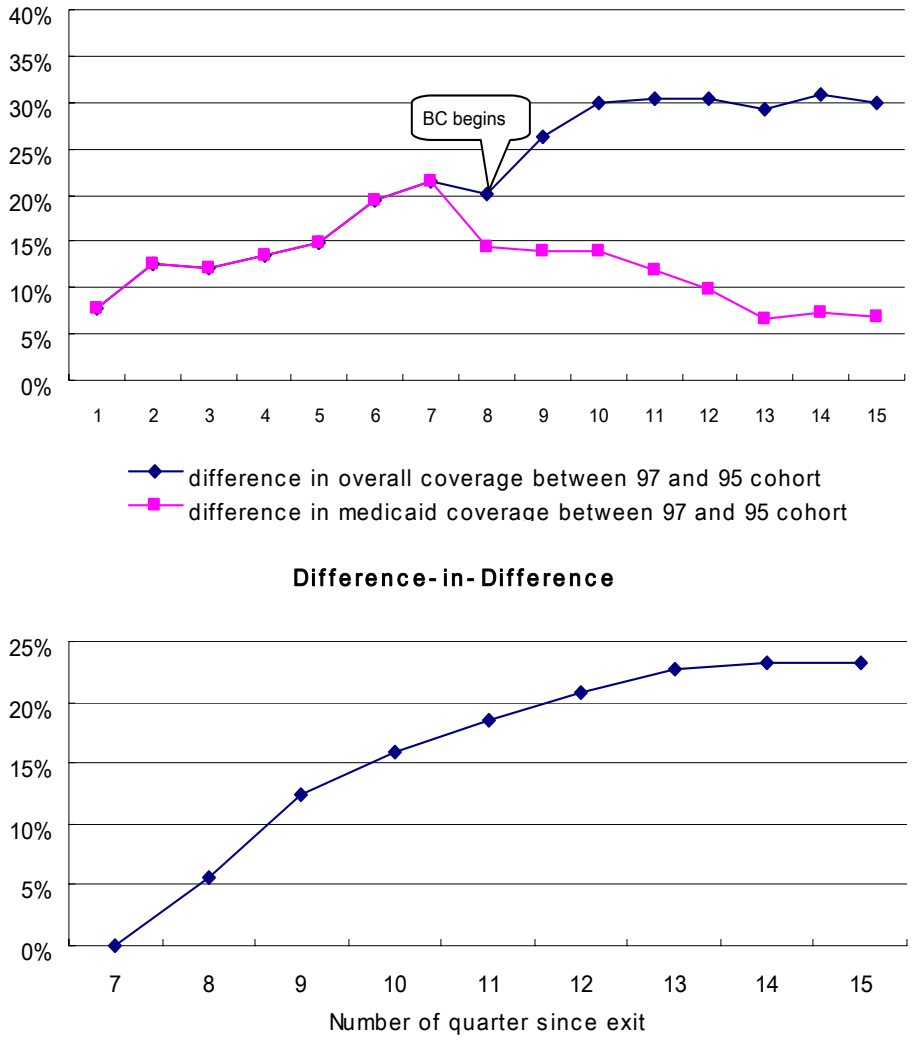


Figure A2.2
Among Eligible Participants: The Difference in Take-up Rate of Overall Public Health Insurance and MA between Cohorts, and the Difference-in-Difference

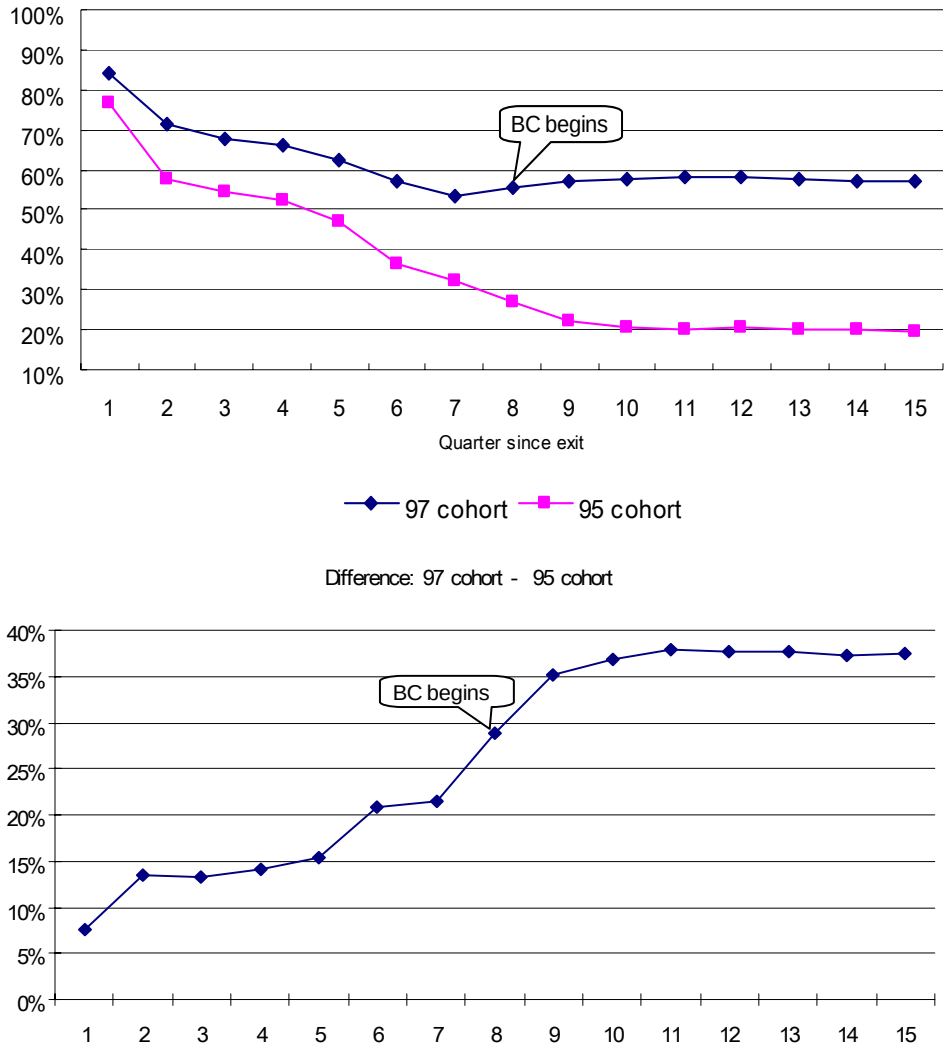


The Effect of BadgerCare on Public Health Insurance Coverage among All Leavers

The Overall Effect among All Leavers

Figure A2.3 shows the quarter-by-quarter pattern in public health insurance coverage among all leavers in both the 1995 and 1997 cohorts. The difference between the two series is relatively constant in the period before BadgerCare, but increases substantially after quarter 8.

Figure A2.3
Among All Leavers:Take-up Rate of Public Health Insurance and the Difference Between the 1995 and 1997 Cohorts



The summary of the quarter-by-quarter pattern of difference in public health insurance coverage among all leavers follows—the average difference rises from about 15 percentage points before BadgerCare to 36 percentage points afterward, implying that the program has a difference-in-difference effect of about 21 percentage points.

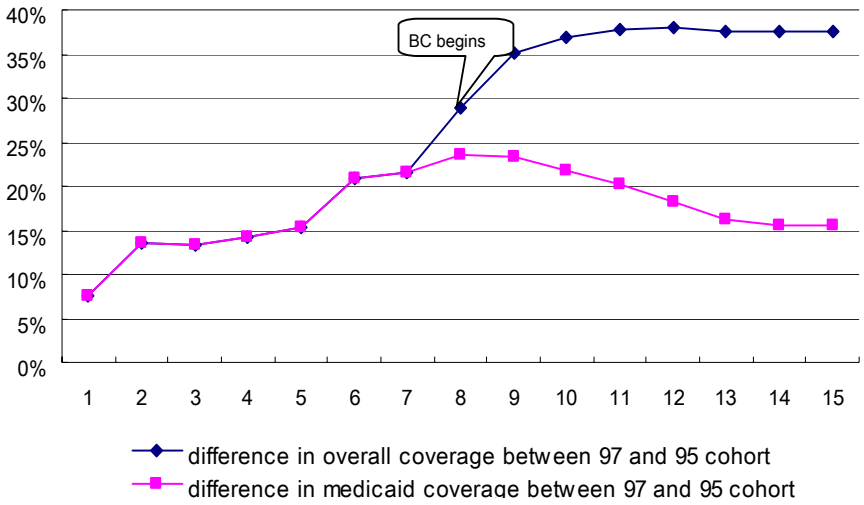
Changes in BadgerCare and MA Coverage among All Leavers

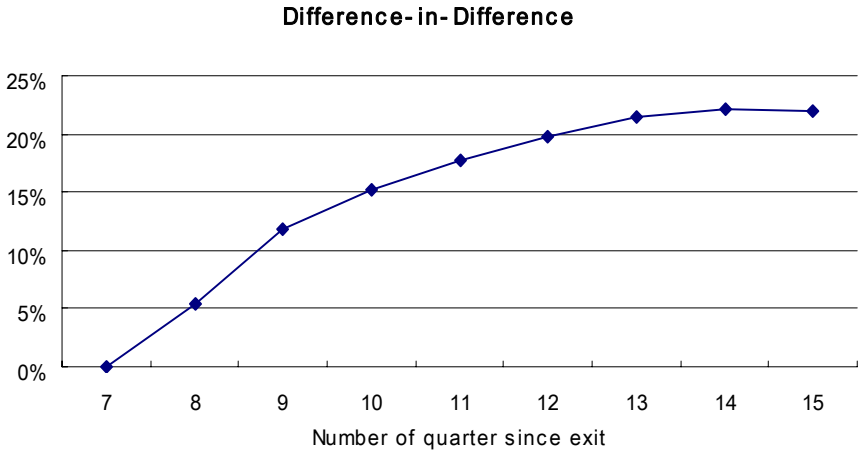
The combined effect of BadgerCare on both overall and MA coverage for all leavers can also be shown for each quarter. The quarterly pattern of the 1997–1995 difference in both overall and MA

coverage among all leavers is shown in Figure A2.4. The average difference in MA coverage of all leavers during the after BadgerCare period exceeded that of before BadgerCare period by about 4.1 percentage points, suggesting the introduction of BadgerCare might have slightly increased the utilization of MA among all leavers.

Apart from this indirect effect on MA take-up, the effect of BadgerCare on the overall take-up rate of public health insurance among all leavers was greatly increased— a 21.0 percentage-point increase from before to after the BadgerCare period. Therefore the corresponding difference-in-difference rate of 16.9 percentage points is considered to be due to the introduction of BadgerCare. The quarter-by-quarter pattern of this BadgerCare effect reflected in difference-in-difference is shown in Figure A2.4 for quarters 8–15.

Figure A2.4
Among Eligible Participants: The Difference in Take-up Rate of Overall Public Health Insurance and MA between Cohorts, and the Difference-in-Difference





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